MS-9245

1U Rackmount Server

User's Guide

G52-S9245X3

Manual Rev: 2.1
Release Date: April 2004

CE N1996

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

FC **Micro-Star International**
MS-9245

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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Revision History

Revision	Revision History	Date
V2.1	Based on V2.0, adding DDR400, PCI-X 133	April 2004

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

- Visit the MSI website for FAQ, technical guide, BIOS updates, driver updates, and other information: **http://www.msi.com.tw/**
- Contact our technical staff at: **support@msi.com.tw**

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment has not work well or you can not get it work according to User's Manual.
    - The equipment has dropped and damaged.
    - The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60^0C (140^0F), IT MAY DAMAGE THE EQUIPMENT.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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Getting Started

Thanking you for choosing the MS-9245 1U Rackmount Server Barebone! The MS-9245 1U Rackmount Server is a high-performance barebone system powered by AMD Opteron™ processors in Socket 940. With high scalability, reliability, ease of use, and overall value, the MS-9245 makes an ideal choice for value conscious customers.

System Specifications

Mainboard
⑥ MSI-9145 mainboard

CPU
⑥ Supports AMD Opteron™ 200 or Opteron™ 100 up to 2.4GHz

Chipset
⑥ AMD 8111 I/O bridge
⑥ AMD 8131 PCI-X Hub

2D/3D graphics controller
⑥ ATI Rage XL Video Controller with 8 MB of memory

Memory
⑥ Supports up to 8 Registered ECC DDR200/266/333/400 DIMMs
⑥ 2GB per DIMM for a maximum memory size of 16 GB

PCI Slot
⑥ PCI-X 64-bit 100/133MHz x 2
- one full length and one half length PCI slots

Drive Bays
⑥ 2 Hot-Swap SCSI (or Non-hotswap IDE) HDD
⑥ 1 Slim CD-ROM

Front I/O
⑥ 2 USB ports

Rear I/O
⑥ 2 USB ports
⑥ 1 VGA port
⑥ 1 serial port
⑥ 2 RJ-45 LAN jacks

SCSI (optional)
⑥ Single channel SCSI Ultra320 (LSI 1020)

LAN
⑥ Broadcom 2 ports Gigabit LAN (BCM5704C)

IDE
⑥ 2 IDE connectors, supporting up to 4 ATA-100/133 compatible devices

MSI Server Management IPMI 1.5 (optional)
⑥ MSI-9549 BMC card (with QLogic Zircon UL BMC) and MSI iConsole AP support IPMI 1.5 (optional)

FAN
⑥ 4 pcs, 40 x 28 mm system fan
⑥ 1 pc, 40 x 20mm I/O fan
⑥ 3 pcs integrated into power supply

Power Supply
⑥ 411W max.
⑥ Active PFC
⑥ Full range 100 ~ 240V AC

Dimension (WxDxH)
⑥ 440(W) x 660(D) x 43(H) mm

Others
⑥ High Performance Thermal Solution

MS-9549 BMC Card Specification

BMC Chip :
- Qlogic Zircon UL (ARM7 TDMI 40M RISC) , 128pin PQFP
- Host hardware interface : LPC interface
- Host software interface : KCS interface

Memory Size
- 256 X 16 Bits SRAM
- 4M Bits Flash

Form Factor:
- Add-on Card on SO-DIMM (144 pin , Key position in 50)

On-board I2Cmux
- 9545

On board Connector/Header:
- JTAG header (14 pin) for debugging

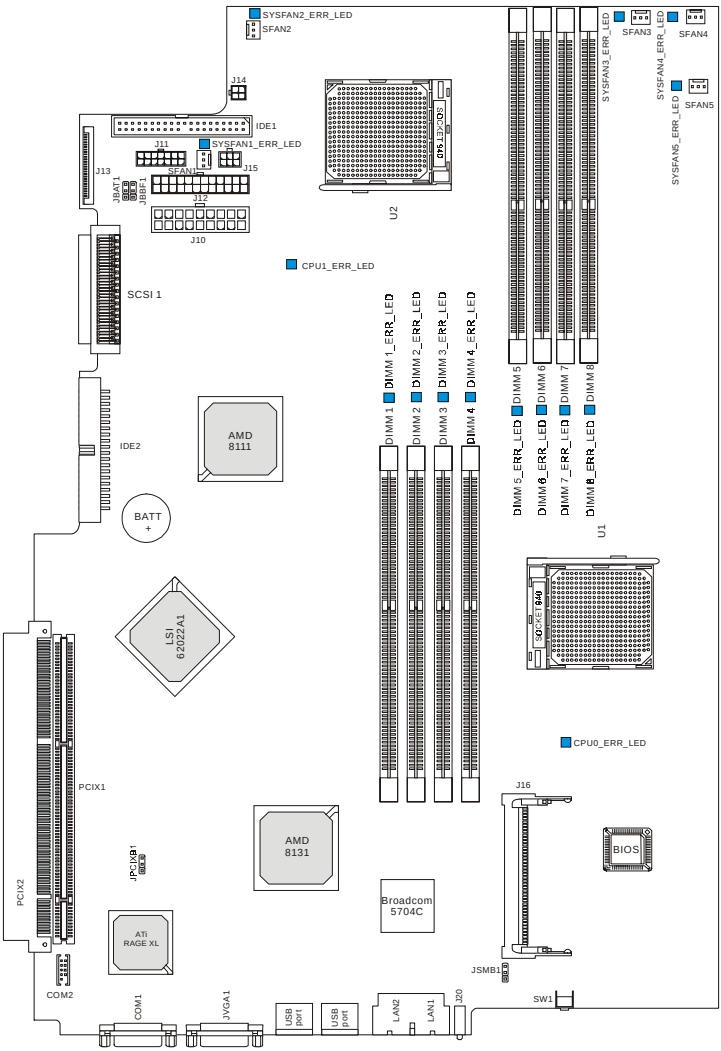
Key Features:
- IPMI 1.5 Compliant
- Out-of-band LAN based management using RMCP
- FRU/SEL access
- Remote out-of-band alerts
- Event log
- Support for CLI (command line interface) over Serial or shared NIC (RMCP)
- Ability to update firmware inband unattended
- Remote access security (MD5)
- Out-of-band environmental monitoring and alerting
- Secure remote power control and system reset over Serial or shared NIC (RMCP)
- Support Microsoft EMS
- Support on-board I2C ADM 1027 to extend Hardware monitor feature

System Management:
Two SMBus 2.0 (I2C)
One SMBus for Broadcom 5704C
One SMBus for ADM 1027 , SEEPROM access , CPU thermal sensor

CPU Fan speed control dependent on System Temperature
System Fan speed control dependent on System Temperature

Sensor Management
Monitored Voltage: +12V, +5V, +3.3V, Vcore, 5V standby, +2.5V
Thermal protection (CPU/System overheat shut down through BMC)
No Chassis Intrusion
LED x 6 (Power , DASD , Fault , ID_LED , BMC Heartbeat)
On-Board Diagnostic LEDs (8 x Memory DIMM, 2 x CPU, 5 x FAN)
Support shared NIC (Broadcom 5704C)

Mainboard Layout



MS-9145 v1.X Mainboard

Packing Checklist

Unpack the package and check if all items listed below are present. If any item contained in the package is damaged or missing, please contact your local dealer for replacement. In addition, keep the box and packing materials for possible future use.

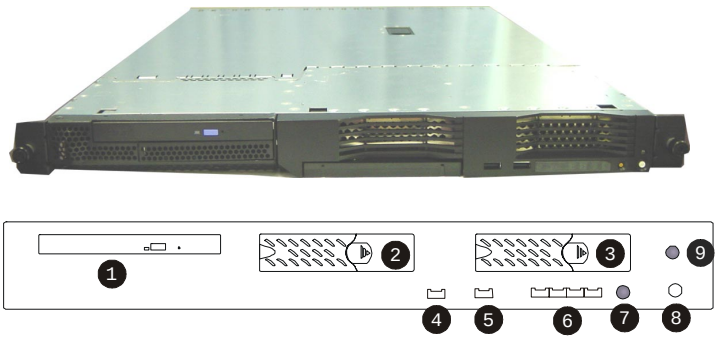
Your MS-9245 1U Rackmount Server Barebone package should contain the following items:

*** MS-9245 1U Rackmount Server x 1**
(including a MS-9145 mainboard, a MS-9549 BMC card, a Power Supply and a Fan Duct)
*** Heatsink x 2**
*** 6”32 x 5 screw x 8**
*** HDD tray set (2 in a set, IDE model) x 2**
*** Rail Kit x 1**
(including two rails and cable ties)
*** User’s Guide x 1**
*** Installation Floppy Disk x 1**
*** Server Driver CD x 1**
*** iConsole Suite CD (optional) x 1**

System Configuration

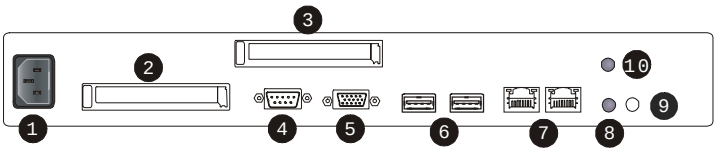
This section shows the configuration of the MS-9245 from different angles, and the connectors and buttons on the front and back panel.

Front View



1. Slim CD-ROM (optional)
2. **Hot Swap 80-pin SCSI HDD:** HDD 1 (ID0)
   IDE HDD: HDD 2 (Primary Slave)
3. **Hot Swap 80-pin SCSI HDD:** HDD 2 (ID1)
   IDE HDD: HDD 1 (Primary Master)
4. USB Port 1
5. USB Port 2
6. (from left to right) IDE HDD Activity LED, Location LED, Info LED & Error LED**
7. Reset Button
8. Power Button
9. Power LED*

Rear View



1. AC Power Connector
2. Half Length PCI Slot 2
3. Full Length PCI Slot 1
4. Serial Port
5. VGA Port
6. (from left to right) USB Port 3 & USB Port 4
7. (from left to right) Gbit Port 2 & Gbit Port 1
8. Power LED*
9. NMI Switch
10. Error LED**

NOTE
** Please refer to Table 1. MS-9245 Front Bezel & Rear I/O LEDs Definitions for more information on Power LED.*
*** Please refer to Table 2. MS-9245 System Error and Diagnostic LEDs Definitions for more information on Error LED.*

Table 1. MS-9245 Front Bezel & Rear I/O LEDs Definitions

LED	Color	State	Description
Power	Green	ON	System operating
		Blink	System main power off and standby power on
	OFF	OFF	AC power removed
IDE HDD Activity	Green	Random blink	IDE HDD access activity
	OFF	OFF	No disk activity
Error	Amber	ON	Some component error/failure
	OFF	OFF	System normal operation
Location (Controlled by MSI iConsole AP only)	Blue	ON	Identify active via iConsole command
	OFF	OFF	No identification
Information	Amber		Reserved for new BIOS function upgrade
Swappable SCSI HDD Access	Green	Random blink	HDD access activity
	OFF	OFF	No disk activity

Table 2. MS-9245 System Error and Diagnostic LEDs Definitions

Item	Error LED	Diagnostic LED	Description/Symptoms
1	OFF	OFF	Normal operation
2	ON	CPU Error LED ON	Processor related problems
3	ON	SCSI Error LED ON	SCSI hard drive Error/failure
4	ON	FAN Error LED ON	Fan failure
5	ON	Memory Error LED ON	Memory error/failure
6	ON	N/A	Power supply error/failure

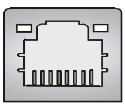
Diagnostic LEDs

Diagnostic LEDs use signal display to help users understand their system.When POST or Service Processor detects an error, the corresponding LEDs light up to alert the user to the condition and help service personnel identify the failing component. A system error single LED on the front panel and in the rear of the system first alters the users that an error has occurred. Service personnel next check inside the system to determine which subsystem has an error LED lit. This information helps the service personnel to locate the failing component for replacement. The full failing path remians lit until POST no longer exists or the error is fixed.

The Rear Panel provides the following connectors:

LAN (RJ-45) Jacks: Giga-bit LAN

The mainboard provides two standard RJ-45 jacks for connection to Local Area Network (LAN). Giga-bit LAN enables data to be transferred at 1000, 100 or 10Mbps. You can connect a network cable to either LAN jack.

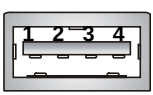


Giga-bit LAN Pin Definition

PIN	SIGNAL	DESCRIPTION
1	D0P	Differential Pair 0+
2	D0N	Differential Pair 0-
3	D1P	Differential Pair 1+
4	D2P	Differential Pair 2+
5	D2N	Differential Pair 2-
6	D1N	Differential Pair 1-
7	D3P	Differential Pair 3+
8	D3N	Differential Pair 3-

USB Connectors

The mainboard provides an UHCI (Universal Host Controller Interface) Universal Serial Bus root for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into ths connector.



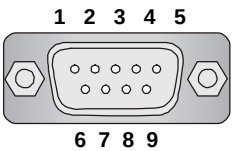
USB Port

USB Port Description

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground

Serial Port Connectors: COM 1 & COM 2 (optional)

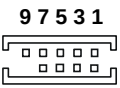
The mainboard offers two 9-pin DIN connectors for serial ports COM 1 and COM 2. The ports are 16550A high speed communication ports that send/ receive 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to them.



COM 1

COM 1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate



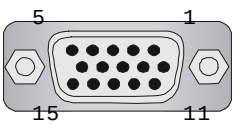
COM 2

COM 2 Pin Definition

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Data Carrier Detect	2	Receive Data
3	Transmit Data	4	Data Terminal Ready
5	Ground	6	Data Set Ready
7	Request to Send	8	Clear to Send
9	Ring Indicator	10	Ground

VGA Connector

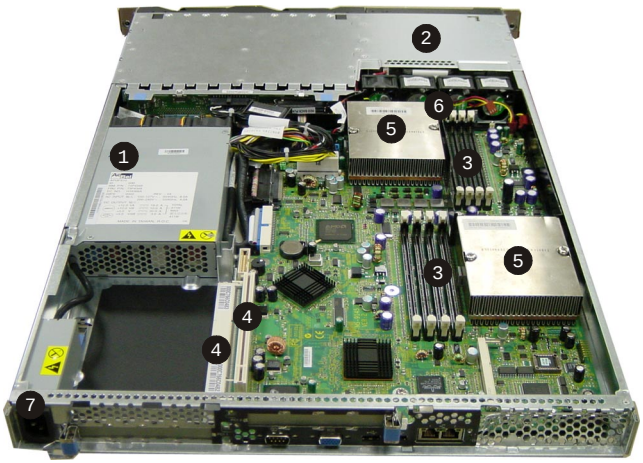
The mainboard provides a DB 15-pin female connector to connect a VGA monitor.



VGA Connector
(DB 15-pin)

Pin	Signal Description
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	+5V
10	GND
11	N/C
12	SDA
13	Horizontal Sync
14	Vertical Sync
15	SCL

Top View



1. Proprietary Power Supply
2. Slim CD-ROM Drive
3. DIMM Slots
4. PCI Slots
5. Heatsinks
6. Fan Duct
7. AC Power Connector

Hardware Setup

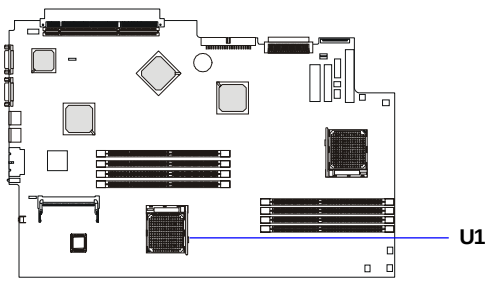
This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. Also, it provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc.

While doing the installation, be careful in holding the components and follow the installation procedures.

Central Processing Unit: CPU

The mainboard supports **Single** AMD® Opteron UP or **Dual** AMD® Opteron DP™ processor(s). The mainboard uses two CPU sockets called Socket 940 for easy CPU installation. You can install SINGLE or DUAL CPUs on the mainboard to meet your own needs. Keep the following points in mind before installing CPU(s):

1. If **SINGLE** CPU is intended, always install the CPU on the **U1** socket.



2. To install **DUAL** CPUs on the board, you must use **the same type/ stepping of AMD Opteron DP™ CPUs running at the same frequency**.

WARNING!

Thermal Issue for CPU

As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly crucial when building computer systems. Maintaining the proper thermal environment is key to reliable operation. As such, the processor must be maintained in the specified thermal requirements.

You need to add thermal grease between the CPU and heatsink to improve heat dissipation. Then, make sure that the CPU and heatsink are securely fastened and in good contact with each other. These are needed to prevent damaging the processor and ensuring reliable operation. If you want to get more information on the proper cooling, you can visit AMD's website for reference.

CPU Installation Procedures for Socket 940

1. Make sure that the computer is turned off, and the power cord disconnected before installing the CPU.

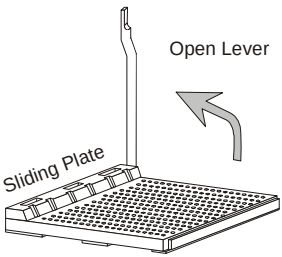
2. Pull the lever sideways away from the socket, and raise it up to a 90-degree angle.

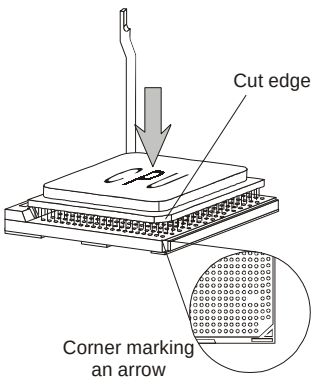
3. Locate the cut edge of the CPU. When the CPU is installed into the socket, this cut edge should be aligned with the corner marking an arrow on the Socket 940.

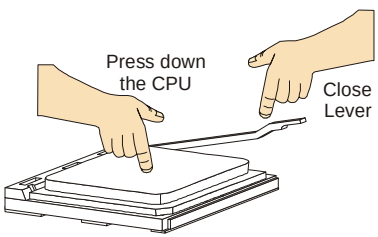
Please note that the CPU can only fit in a correct orientation, **DO NOT** use force to install the CPU into the socket.

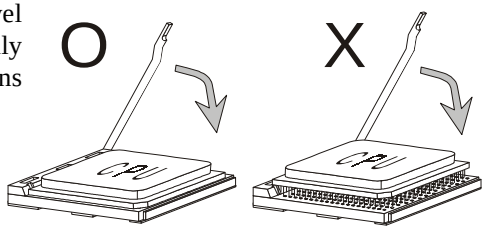
4. Place the CPU onto the socket and press it down firmly into the socket. The pins of the CPU should be embedded into the socket completely.

5. Close the lever to secure the CPU. Do not close the level until the CPU's pins are fully inserted; otherwise, the pins may be damaged.



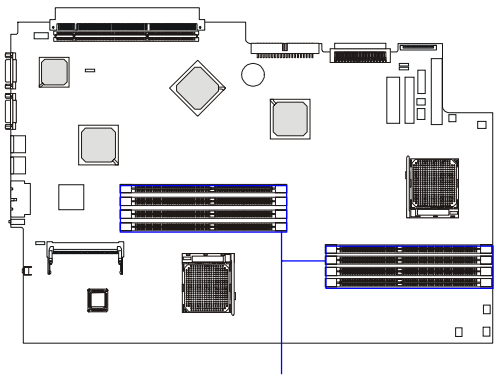






Memory

The mainboard supports up to eight registered ECC DDR200/266/333 DIMMs providing up to 16GB of memory. Each DIMM slot supports up to a maximum size of 2GB. You can install either single- or double-sided modules to meet your own needs.



DDR DIMM Slots

DIMM Module Combination

You can install either one or two DIMM modules on the slots. **Use Slot 1, 3, 6 or 8 for single DDR module installation. If DDR modules are installed on Slot 5 ~ 8, CPU2 must be installed.**

Memory modules can be installed in any combination as follows:

Option	Memory Modules Installed
1	Slot 1&2, Slot 3&4, Slot 5&6, Slot 7&8
2	Slot 1&2&3&4, Slot 1&2&5&6, Slot 1&2&7&8, Slot 3&4&5&6, Slot 3&4&7&8, Slot 5&6&7&8
3	Slot 1&2&3&4&5&6, Slot 1&2&3&4&7&8, Slot 1&2&5&6&7&8, Slot 3&4&5&6&7&8
4	Slot 1&2&3&4&5&6&7&8

NOTE

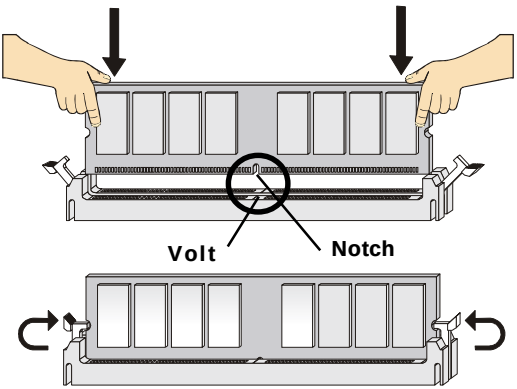
*Memory modules "in pairs" must be of **the same type and size**.*

Installing DDR Modules

1. The DDR DIMM has only one notch on the center of module. The module will only fit in the right orientation.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.

3. The plastic clip at each side of the DIMM slot will automatically close.



NOTE
You can barely see the golden finger if the module is properly inserted in the socket.

Power Supply

The mainboard supports SSI power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

18-Pin Main Power Supply Connector: J10

This connector provides power supply to the system board.

14-Pin Standby and Status Control Connector: J11

This connector provides power supply to the system board.

24-Pin SCSI Power and I2C Connector: J12

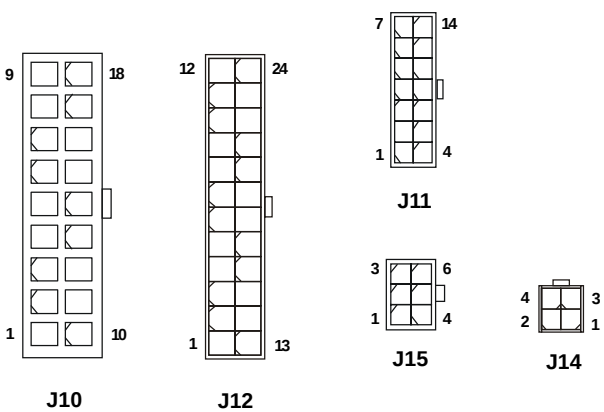
This connector is an optional power connector to provide power output to the SCSI HDD.

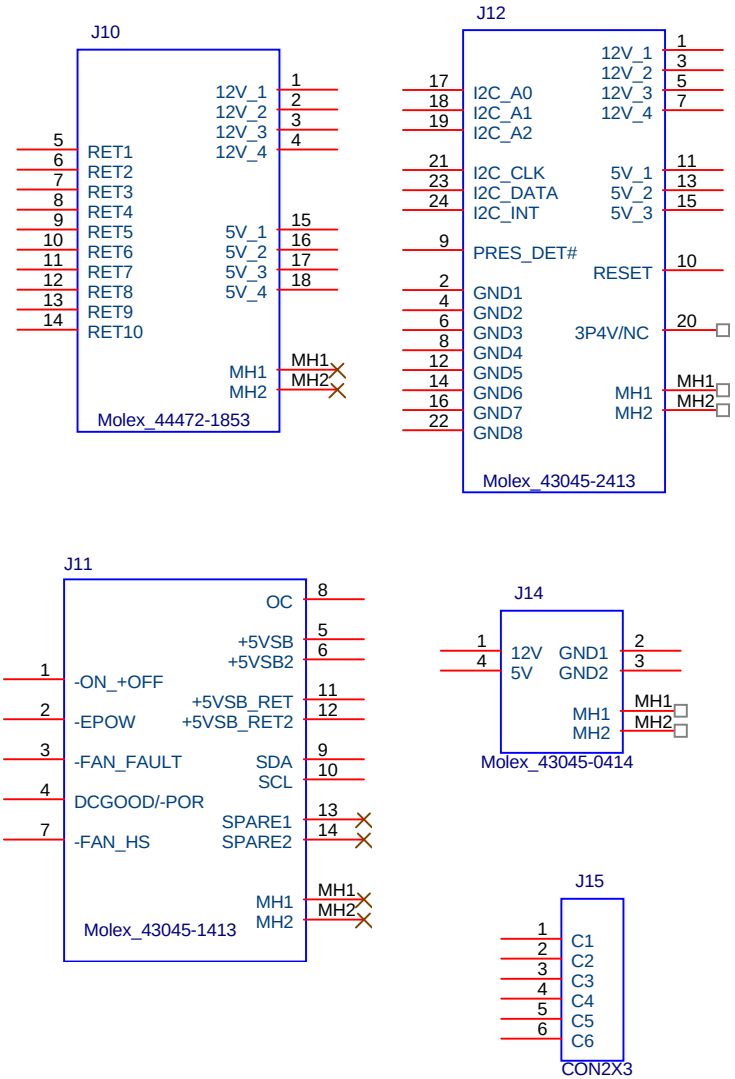
4-Pin CD-ROM Power Connector: J14

This connector provides power supply to the CD-ROM Drive.

6-Pin Front Plane USB Connector: J15

This connector provides power supply to the front USB ports.




J10
12V_1
12V_2
12V_3
12V_4
RET1
RET2
RET3
RET4
RET5
RET6
RET7
RET8
RET9
RET10
5V_1
5V_2
5V_3
5V_4
MH1
MH2
Molex_44472-1853
J12
12V_1
12V_2
12V_3
12V_4
I2C_A0
I2C_A1
I2C_A2
I2C_CLK
I2C_DATA
I2C_INT
5V_1
5V_2
5V_3
PRES_DET#
RESET
GND1
GND2
GND3
GND4
GND5
GND6
GND7
GND8
3P4V/NC
MH1
MH2
Molex_43045-2413
J11
OC
+5VSB
+5VSB2
-ON_+OFF
+5VSB_RET
+5VSB_RET2
-EPOW
-FAN_FAULT
SDA
SCL
DCGOOD/-POR
SPARE1
SPARE2
-FAN_HS
MH1
MH2
Molex_43045-1413
J14
12V
5V
GND1
GND2
MH1
MH2
Molex_43045-0414
J15
C1
C2
C3
C4
C5
C6
CON2X3

Connectors

SM Card 3rd I2C Bus Connector: JSMB1

The mainboard provides one I2C (also known as I^2C) Bus connector for users to connect to System Management Bus (SMBus) interface.

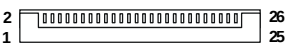
JSMB1

JSMB1 Pin Definition

PIN	SIGNAL
1	DATA
2	CLK
3	ALT#

Front Panel Connector: J13

The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs.



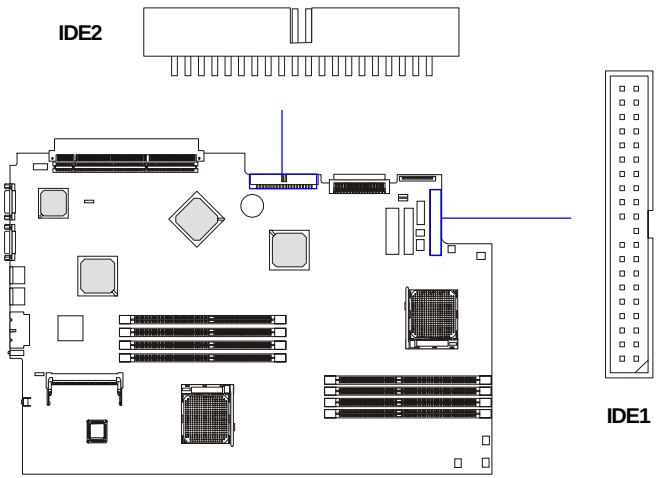
J13

J13 Pin Definition

Pin	Description	Pin	Description
1	GND	2	SM_PWRLED#
3	GND	4	FP2SW_RST#
5	GND	6	Unused
7	+5VSB	8	Unused
9	+5VSB	10	SMB_2_DATA
11	+5VSB	12	SMB_2_CLK
13	Unused	14	GND
15	+5V	16	SM_FP_DET#
17	+5V	18	USB1_OC_L
19	+5V	20	SB_GPIO14
21	+5V	22	SM_LED4_SEL
23	GND	24	FP2SW_PWRBTN#
25	GND	26	Unused

Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect up to four hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices.



IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)

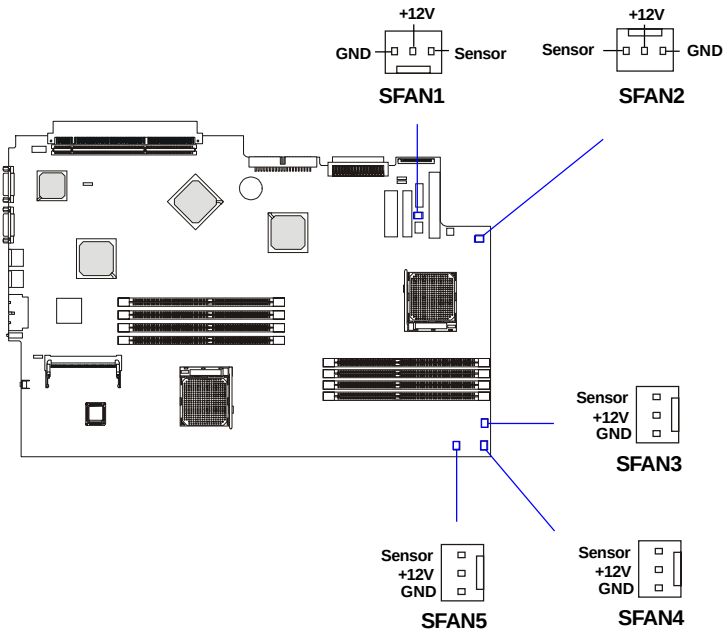
IDE2 can also connect a Master and a Slave drive.

NOTE

If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Fan Power Connectors: SFAN1/SFAN2/SFAN3/SFAN4/SFAN5

The SFAN1/SFAN2/SFAN3/SFAN4/SFAN5 (system fans) support system cooling fan with +12V. It supports three-pin head connector. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

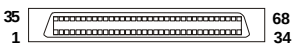


NOTE

1. Always consult the vendors for proper CPU cooling fan.
2. SFAN supports the fan control. MS-9245 will automatically control the CPU fan speed according to the system temperature.

Ultra320 SCSI Connector: SCSI 1

SCSI (Small Computer System Interface) is a hardware interface that allows for connection of up to 15 peripheral devices. The mainboard provides one SCSI channel (SCSI 1) for you to connect SCSI devices such as SCSI hard disks.



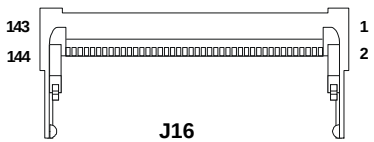
SCSI 1

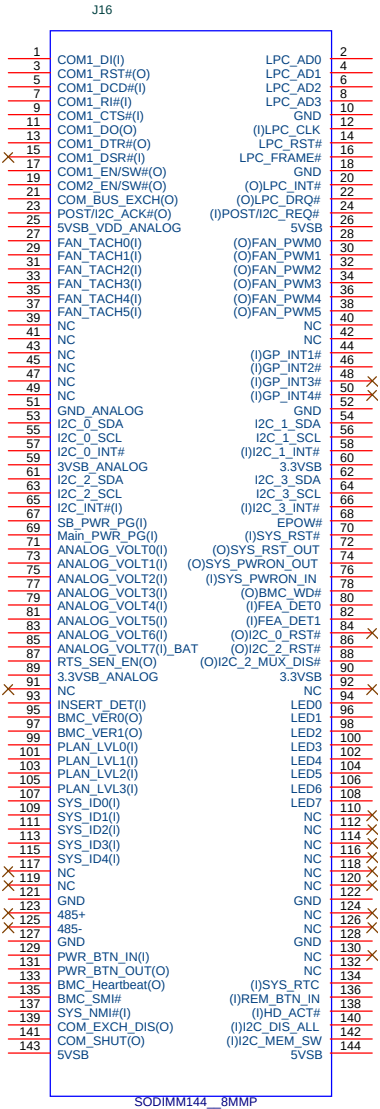
68-Pin Ultra320 SCSI Connector

Pin	Description	Pin	Description
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DB(P1)	39	-DB(P1)
6	+DB(0)	40	-DB(0)
7	+DB(1)	41	-DB(1)
8	+DB(2)	42	-DB(2)
9	+DB(3)	43	-DB(3)
10	+DB(4)	44	-DB(4)
11	+DB(5)	45	-DB(5)
12	+DB(6)	46	-DB(6)
13	+DB(7)	47	-DB(7)
14	+DB(P)	48	-DB(P)
15	GROUND	49	GROUND
16	DIFFSENS	50	GROUND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20	GROUND	54	GROUND
21	+ATN	55	-ATN
22	GROUND	56	GROUND
23	+BSY	57	-BSY
24	+ACK	58	-ACK
25	+RST	59	-RST
26	+MSG	60	-MST
27	+SEL	61	-SEL
28	+C/D	62	-C/D
29	+REQ	63	-REQ
30	+I/O	64	-I/O
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

Server Management Card Connector: J16

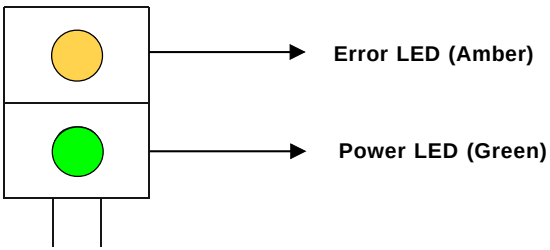
This connector allows you to insert a Server Management Card.





Rear Status LED: J20

The LED shows the error and power status.



Jumpers

Boot Block Jumper: JBBF1

Users can short connect pin#2-3 to recover the system BIOS with a Recovery Floppy. When the system is done with the job, the buzzer will beep to notify the user and set the jumper to its normal state (pin#1-2 short connected).

JBBF1

Normal

Recovery

PCI-X 100/133 Jumper: JPCIXB1

The jumper is used to set the channel B of 64-bit PCI bus (PCIX) to run at 100MHz or at 133MHz (for use with one PCI-X 133 device).

JPCIXB1

100MHz

133MHz

Clear CMOS Jumper: JBAT1

If you want to clear the system configuration, use the JBAT1 (Clear CMOS Jumper) to clear data.

JBAT1

Keep Data

Clear Data

NOTE

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Slots

The motherboard provides two 64-bit PCI-X 100/133MHz slots. One is full length and the other is half length.

PCI Slots

Two PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus INT A# ~ INT D# pins as follows:

IRQ Routing

Devices	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT D#	INT A#	INT B#	INT C#
LAN	INT A#	INT B#		
VGA	INT A#			
SCSI	INT C#			

Primary IDE Interrupt: IRQ14 (for AMD8111)
Secondary IDE Interrupt: IRQ15 (for AMD8111)

BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use. You may need to run the Setup program when:

- ✧ An error message appears on the screen during the system booting up, and requests you to run SETUP.
- ✧ You want to change the default settings for customized features.

Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:

A6380MS V1.0 091096 where:

1st digit refers to the BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
2nd - 5th digit refers to the model number.
6th - 7th digit refers to the customer as MS = all standard customers.
V1.0 refers to the BIOS version.
091096 refers to the date this BIOS was released.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <F2> key to enter Setup.

```
Press F2 to enter SETUP
```

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Control Keys

Key	Function
<F1> or <Alt-H>	General Help window
<Esc>	Exit this menu
↔ arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up and down
<Tab> or <Shift-Tab>	Cycle cursor up and down
<Home> or <End>	Move cursor to top or bottom of window
<PgUp> or <PgDn>	Move cursor to next or previous page
<F5> or <->	Select the Previous Value for the field
<F6> or <+> or <Space>	Select the Next Value for the field
<F9>	Load the Default Configuration values for this menu
<F10>	Save and exit
<Enter>	Execute Command or Enter Submenu

Getting Help

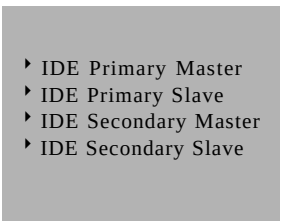
After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.



General Help <F1>

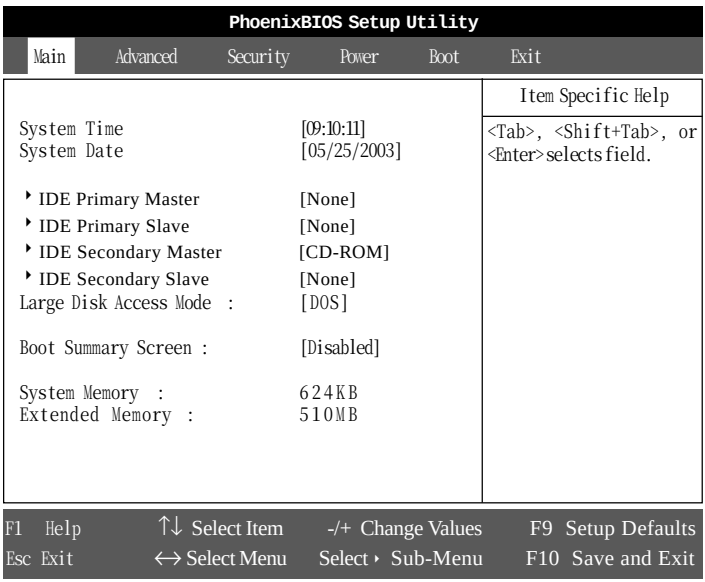
The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

MSI Reminds You...

The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

The Menu Bar

Once you enter **PhoenixBIOS Setup Utility**, the Main Menu will appear on the screen. On the Main Menu screen, you will see basic BIOS settings including system time & date, and the setup categories the BIOS supplies. Use Arrow keys to move among the items and menus, and make changes to the settings.



Main Menu
Use this menu for basic system configurations, such as time, date etc.

Advanced Menu
Use this menu to set up the items of special enhanced features available on your system's chipset.

Security Menu
Use this menu to set Supervisor and User Passwords and the Backup and Virus-Check reminders.

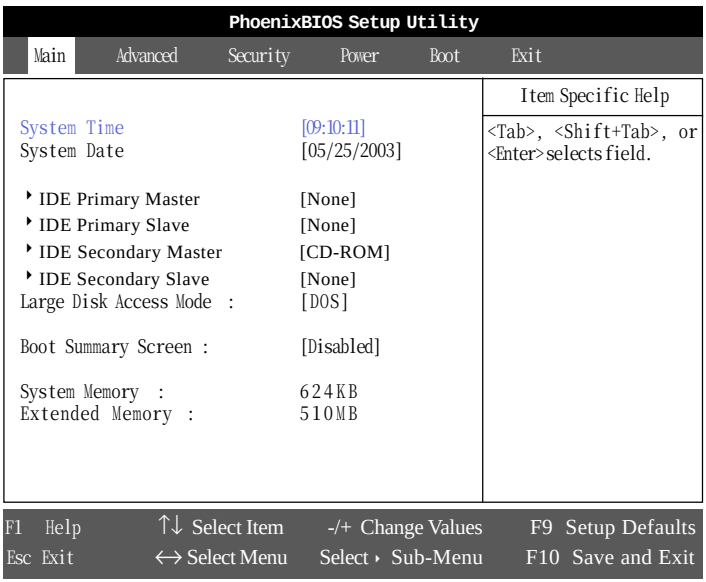
Power Menu
Use this menu to specify your settings for power management.

Boot Menu
Use this menu to specify the priority of boot devices.

Exit Menu
This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

The Main Menu

The items inside the Main menu are for basic system information and configuration. Each item includes none, one or more setup items. Use the Up/Down arrow keys or <Tab> to highlight the item or field you want to modify and use the <+> or <-> key to switch to the value you prefer.



System Time
The time format is <HH> <MM> <SS>.

System Date
The date format is <MM> <DD> <YYYY>.

Primary/Secondary Master/Slave
Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

Type	Select how to define the HDD parameters
Multi-Sector Transfers	Any selection except Disabled determines the number of sectors transferred per block
LBA Mode Control	Enabling LBA causes Logical Block Ad dressing to be used in place of Cylinders, Heads and Sectors.
32-Bit I/O	Enables 32-bit communication between CPU and IDE card
Tranfer Mode	Selects the method for transferring the data between the hard disk and system memory
Ultra DMA Mode	Indicates the type of Ultra DMA.

Large Disk Access Mode
Select DOS if you have DOS. Select Other if you have another operating system such as UNIX. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector. Options: [DOS], [Other].

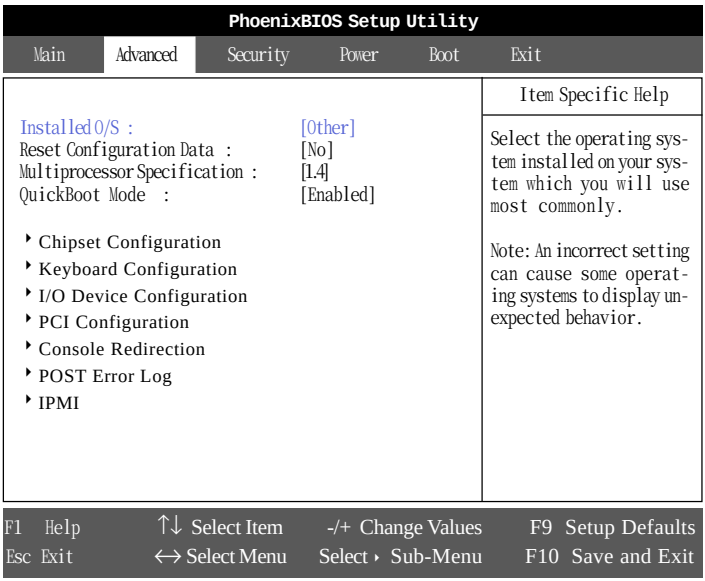
Boot Summary Screen
Selecting Enabled displays system summary screen during boot up. Options: [Enabled], [Disabled].

System Memory
It displays amount of conventional memory detected during boot up.

Extended Memory
It displays the amount of extended memory detected during boot up.

The Advanced Menu

Items in the menu are divided into 7 sub-menus. Each sub-menu provides more settings. To enter the sub-menu, highligh the sub-menu you want to configure and press <Enter>.



Install O/S

Select the operating system installed on your system which you will use most commonly. Options: [Other], [Win95], [Win98], [WinMe], [Win2000].

Reset Configuration Data

Select Yes if you want to clear the Extended System configuration Data (ESCD) area. Options: [Yes], [No].

Multiprocessor Specification

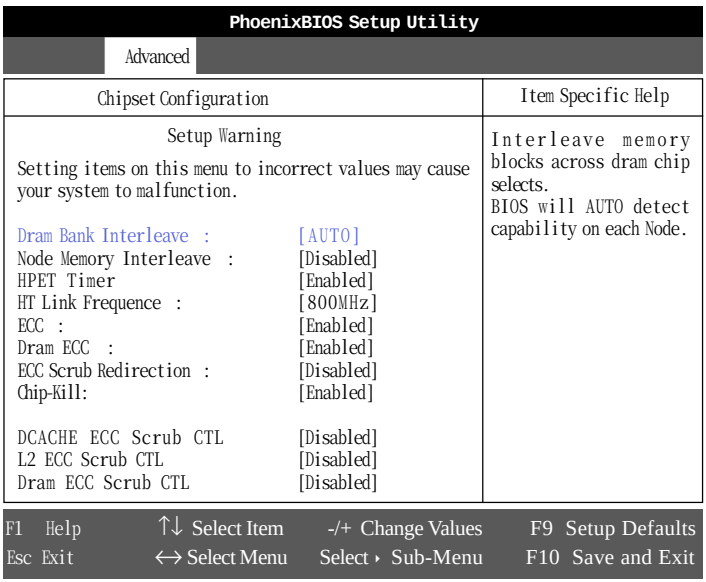
This item allows you to configure the MP Specification revision level. Some operating systems will require 1.1 for compatibility reason. Options: [1.4], [1.1].

Quick Boot Mode

This feature allows the system skip certain tests while booting. This will decrease the time needed to boot the system. Options: [Enabled], [Disabled].

Chipset Configuration

The sub-menu is used to configure chipset features for optimal system performance.


PhoenixBIOS Setup Utility
Advanced
Chipset Configuration
Item Specific Help
Setup Warning
Setting items on this menu to incorrect values may cause your system to malfunction.
Interleave memory blocks across dram chip selects.
BIOS will AUTO detect capability on each Node.
Dram Bank Interleave : [AUTO]
Node Memory Interleave : [Disabled]
HPET Timer [Enabled]
HT Link Frequence : [800MHz]
ECC : [Enabled]
Dram ECC : [Enabled]
ECC Scrub Redirection : [Disabled]
Chip-Kill: [Enabled]
DCACHE ECC Scrub CTL [Disabled]
L2 ECC Scrub CTL [Disabled]
Dram ECC Scrub CTL [Disabled]
F1 Help
↑↓ Select Item
-/+ Change Values
F9 Setup Defaults
Esc Exit
↔ Select Menu
Select ▸ Sub-Menu
F10 Save and Exit

Dram Bank Interleave

Interleave memory blocks across dram chip selects. Options: [Auto], [Disabled].

Node Memory Interleave

Interleave memory blocks across Processor Nodes. BIOS will AUTO detect the capability of Memory System. Options: [Disabled], [AUTO].

HPET Timer
This item allows you to enable/disable HPET high precision event timer. Setting to Disabled will turn off the device and remove it from the ACPI namespace. Options: [Enabled], [Disabled].

HT Link Frequency
This setting specifies the HT (HyperTransport) frequency between CPU0 & CPU1. Setting options: [800MHz], [1GHz].

ECC
This is a global enable function for all blocks within CPU core and North Bridge. After loading setup defaults, restart and enter setup to access Dram ECC setup options. Options: [Enabled], [Disabled].

Dram ECC
If all memory in the system supports ECC, enabling this will initial scrub dram and enable system requests to dram to be checked and/or corrected. Options: [Enabled], [Disabled].

ECC Scrub Redirection
Enable Scrubber to correct errors detected in Dram during normal CPU requests (Foreground scrubbing). Options: [Enabled], [Disabled].

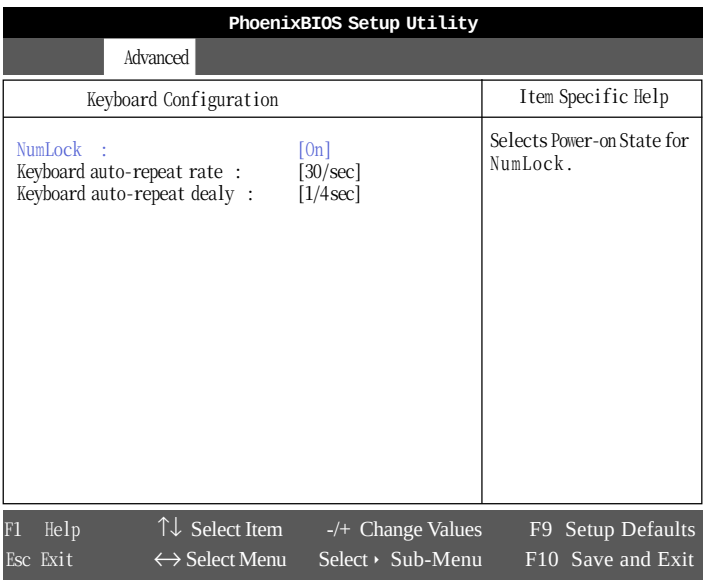
Chip-Kill
This item allows you to enable/disable Chip-Kill ECC on Nodes with all x4 ECC capable dimms. Options: [Enabled], [Disabled].

DCACHE ECC Scrub CTL
This feature sets the rate of background scrubbing for DCACHE lines. Options: [Disabled], [40 ns], [80 ns], [160 ns], [320 ns], [640 ns], [1.28 us], [2.56 us].

L2 ECC Scrub CTL
This feature sets the rate of background scrubbing for L2 cache lines. Options: [Disabled], [40 ns], [80 ns], [160 ns], [320 ns], [640 ns], [1.28 us], [2.56 us].

Dram ECC Scrub CTL
This feature sets the rate of BACKGROUND scrubbing for Dram. (In addition to normal ECC scrubbing from system requests.) Options: [Disabled], [1.31 ms], [2.62 ms], [5.24 ms], [10.49 ms], [20.97 ms], [42.0 ms], [84.0 ms]. ***Note: BACKGROUND agent works independently of CPU requests and bus masters, but cannot be enabled without first enabling Dram ECC.***

Keyboard Configuration
The sub-menu is used to configure keyboard features for optimal system performance.



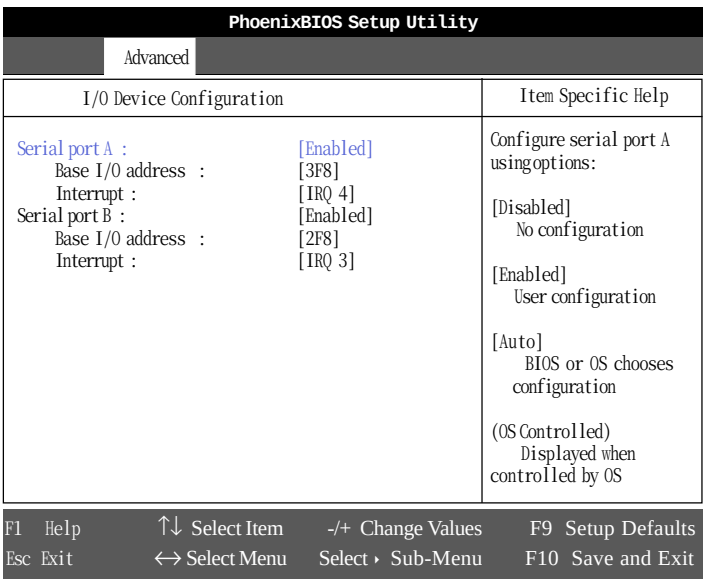
NumLock
On or Off turns NumLock on or off at boot up. auto turns NumLock on if it finds a numeric key pad. Options: [On], [Off].

Keyboard auto-repeat rate
It sets the number of times a second to repeat a keystroke when you hold the key down. Options: [30/sec], [26.7/sec], [21.8/sec], [18.5/sec], [13.3/sec], [10/sec], [6/sec], [2/sec].

Keyboard auto-repeat delay
It sets the delay time after the key is held down before it begins to repeat the keystroke. Options: [1/4 sec], [1/2 sec], [3/4 sec], [1 sec].

I/O Device Configuration

The sub-menu is used to configure I/O Devices for optimal system performance.



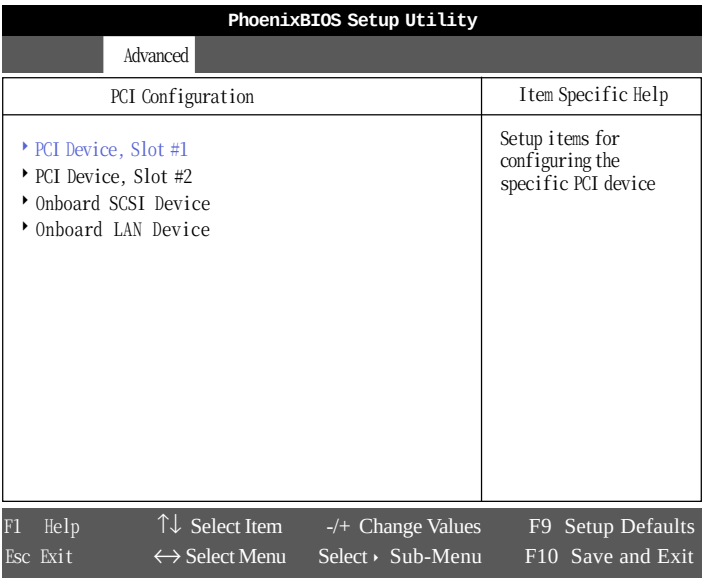
Serial port A/B
Setting to [Enabled] allows users to configure the base I/O address and IRQ of Port A/Port B manually. Selecting Auto allows BIOS to automatically determine the correct base I/O port address. Options: [Enabled], [Disabled], [Auto].

Base I/O address
It specifies the base I/O address for Port A/Port B. Options: [3F8], [2F8], [3E8], [2E8].

Interrupt
It specifies the interrupt for Port A/Port B. Options: [IRQ 3], [IRQ 4].

PCI Configuration

Press PgUp/<+> or PgDn/<-> to PCI Configuration. The following submenu will appear.



PCI Device, Slot #1 & PCI Device, Slot #2

The sub-menu is used to configure the specific PCI device. Press PgUp/<+> or PgDn/<-> to PCI Device, Slot#1 or 2. The following submenu will appear.

Option ROM Scan

Use this feature to initialize device expansion ROM.

Enable Master

Use this feature to enable selected device as a PCI bus master.

Latency Timer

Use this feature to minimize guaranteed time slice allotted for bus master in units of PCI bus clocks.

Onboard LAN Device
The sub-menu is used to configure the onboard LAN device. Press PgUp/<+> or PgDn/<-> to Onboard LAN Device. The following submenu will appear.

LAN Device Function
Use this feature to enable or disable the onboard LAN device.

Option ROM Scan
Use this feature to initialize device expansion ROM.

Enable Master
Use this feature to enable selected device as a PCI bus master.

Latency Timer
Use this feature to minimize guaranteed time slice allotted for bus master in units of PCI bus clocks.

Onboard SCSI Device
The sub-menu is used to configure the onboard SCSI device. Press PgUp/<+> or PgDn/<-> to Onboard SCSI Device. The following submenu will appear.

SCSI Device Function
Use this feature to enable or disable the onboard SCSI device.

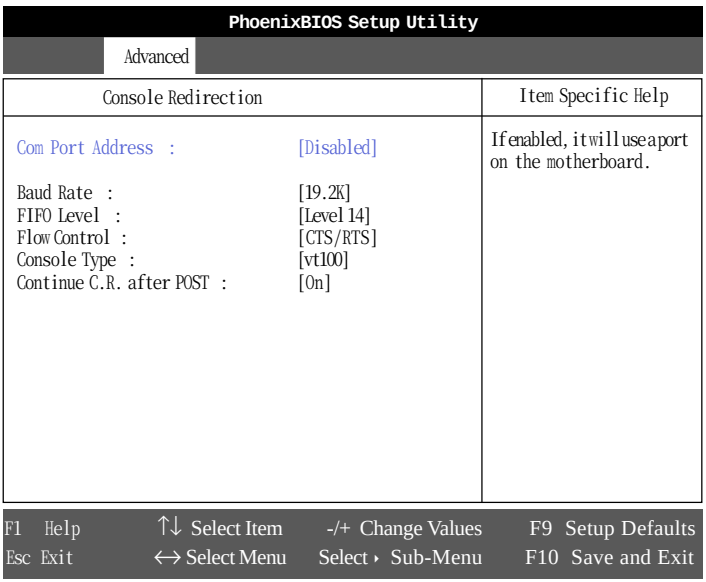
Option ROM Scan
Use this feature to initialize device expansion ROM.

Enable Master
Use this feature to enable selected device as a PCI bus master.

Latency Timer
Use this feature to minimize guaranteed time slice allotted for bus master in units of PCI bus clocks.

Console Redirection

Press PgUp/<+> or PgDn/<-> to Console Redirection. The following submenu will appear.


PhoenixBIOS Setup Utility
Advanced
Console Redirection
Item Specific Help
Com Port Address : [Disabled]
If enabled, it will use a port on the motherboard.
Baud Rate : [19.2K]
FIFO Level : [Level 14]
Flow Control : [CTS/RTS]
Console Type : [vt100]
Continue C.R. after POST : [On]
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Select ▸ Sub-Menu F10 Save and Exit

Com Port Address

This feature allows you to enable/disable the Com port on the motherboard. Options: [Disabled], [On-board COM A].

Console connection

This feature indicates whether the console is connected directly to the system or a modem is used for connection. Options: [Direct], [Via modem].

Baud Rate

It allows you to select delay befor key repeat. Options: [300], [1200], [2400], [9600], [19.2K], [38.4K], [57.6K], [115.2K].

FIFO Level

This feature allows you to enable the specified FIFO level. Options: [Level 4], [Level 14].

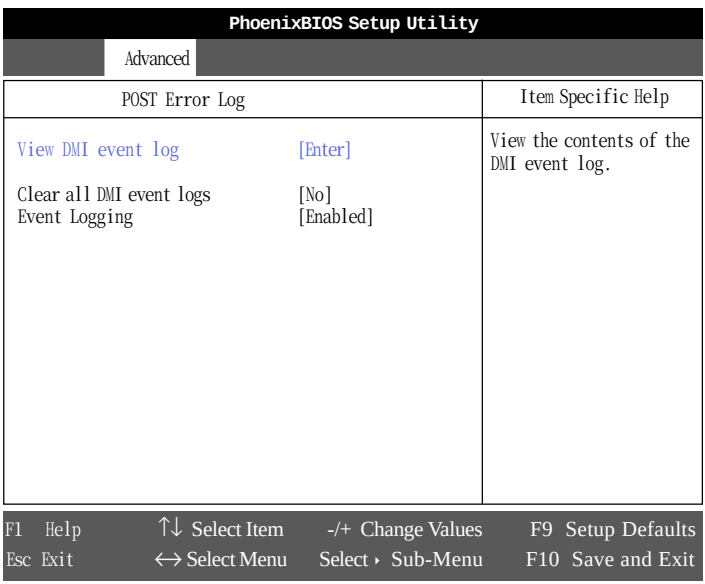
Flow Control
This feature allows you to enable flow control. Options: [None], [XON/XOFF], [CTS/RTS].

Console Type
This feature allows you to enable the specified console type. Options: [vt100], [vt100 8bit], [ANSI 7bit], [ANSI], [ut100 plus], [UTF8].

Continue C. R. after POST
Selecting [On] will enable Console Redirection after OS has loaded. Options: [On], [Off].

POST Error Log

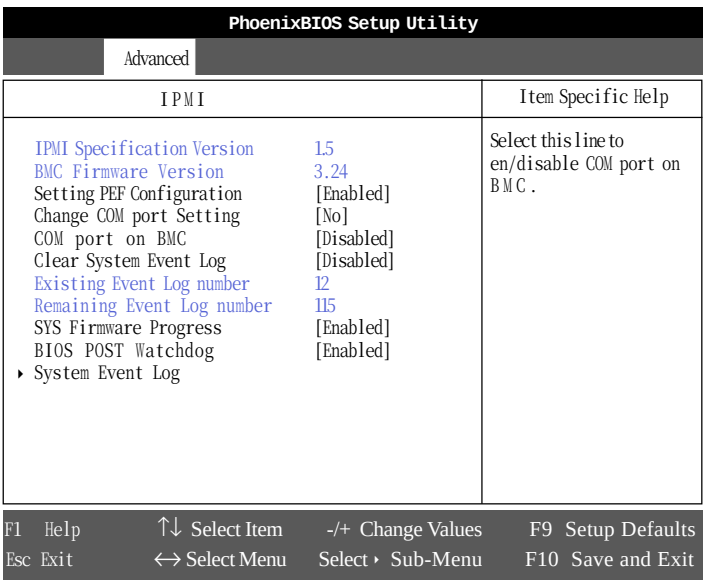
Press PgUp/<+> or PgDn/<-> to POST Error Log. The following submenu will appear.



View DMI event log
Press Enter to view the contents of the DMI event log.

Clear all DMI event logs
Setting this to Yes will clear the DMI event log after rebooting. Options: [Yes], [No].
Event Logging
Select [Enabled] to allow logging of DMI events. Options: [Enabled], [Disabled].

IPMI
Press PgUp/<+> or PgDn/<-> to IPMI. The following submenu will appear.


PhoenixBIOS Setup Utility
Advanced
IPMI
Item Specific Help
IPMI Specification Version 1.5
BMC Firmware Version 3.24
Setting PEF Configuration [Enabled]
Change COM port Setting [No]
COM port on BMC [Disabled]
Clear System Event Log [Disabled]
Existing Event Log number 12
Remaining Event Log number 115
SYS Firmware Progress [Enabled]
BIOS POST Watchdog [Enabled]
System Event Log
Select this line to en/disable COM port on BMC.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Select ▸ Sub-Menu F10 Save and Exit

IPMI Specification Version
It shows the support version of IPMI specification. (read only)

BMC Firmware Version
It shows the current BMC firmware version. (read only)

Setting PEF Configuration
Select this line to enable/disable the Platform Event Filter (PEF). Options: [Disabled], [Enabled].

Change COM port Setting
Select this line to change COM port setting. Options: [Yes], [No].

COM port on BMC
Select this line to enable/disable COM port on BMC. Options: [Disabled], [IPMI], [CLI].

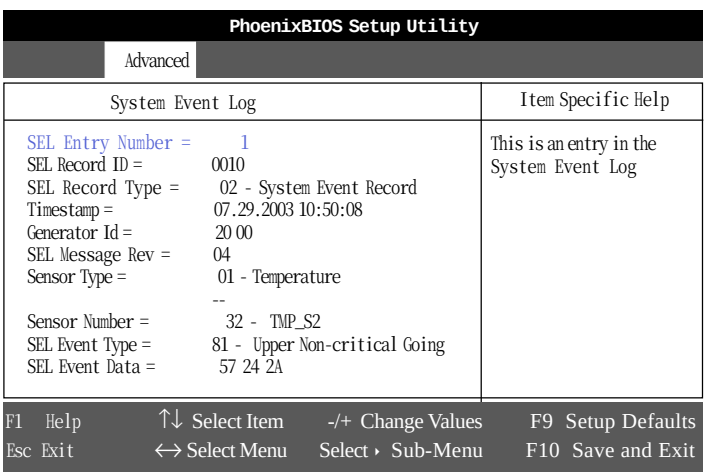
Clear System Event Log
Enabling this selection will force the BIOS to clear the System Event Log on the next boot. Options: [Disabled], [Enabled].

Existing Event Log number/Remaining Event Log number
It shows the number of existing/remaining event log.

SYS Firmware Progress
Enabling this selection will log POST Progress. Options: [Enabled], [Disabled].

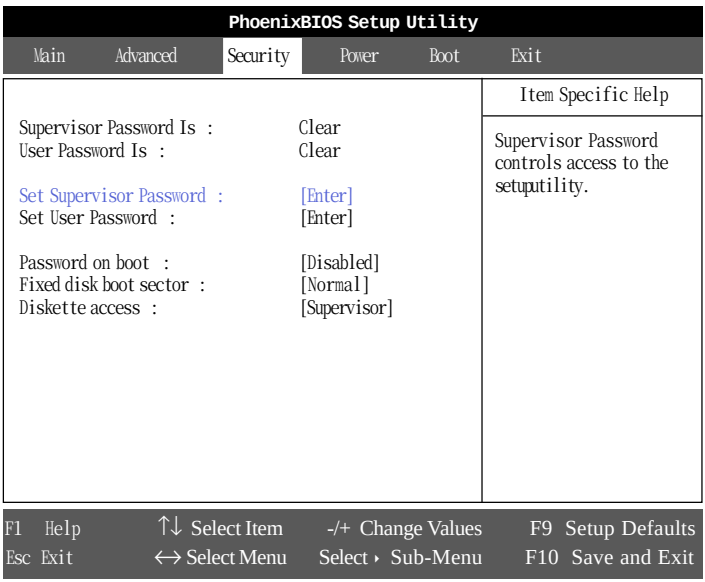
BIOS POST Watchdog
Enabling this selection will enable POST watchdog. Options: [Enabled], [Disabled].

System Event Log
Press <Enter> to display the System Event Log.


PhoenixBIOS Setup Utility
Advanced
System Event Log
Item Specific Help
SEL Entry Number = 1
SEL Record ID = 0010
SEL Record Type = 02 - System Event Record
Timestamp = 07.29.2003 10:50:08
Generator Id = 20 00
SEL Message Rev = 04
Sensor Type = 01 - Temperature
--
Sensor Number = 32 - TMP_S2
SEL Event Type = 81 - Upper Non-critical Going
SEL Event Data = 57 24 2A
This is an entry in the System Event Log
F1 Help
↑↓ Select Item
-/+ Change Values
F9 Setup Defaults
Esc Exit
↔ Select Menu
Select ▸ Sub-Menu
F10 Save and Exit

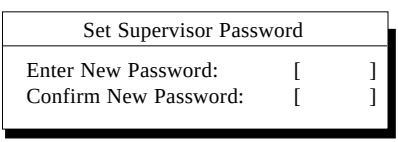
The Security Menu

This section lets you set security passwords to control access to the system at boot time and/or when entering the BIOS setup program. It also allows you to set virus protection at hard disk boot sector.



Supervisor Password Is/User Password Is
It shows the preset supervisor/user password. (read only)

SetSupervisor/User Password
Enabling “Supervisor Password” requires a password for entering Setup. The passwords are not case sensitive. Pressing <Enter> at either Set Supervisor Password or Set User Password displays the following message:



Type the password and press <Enter>. Repeat.

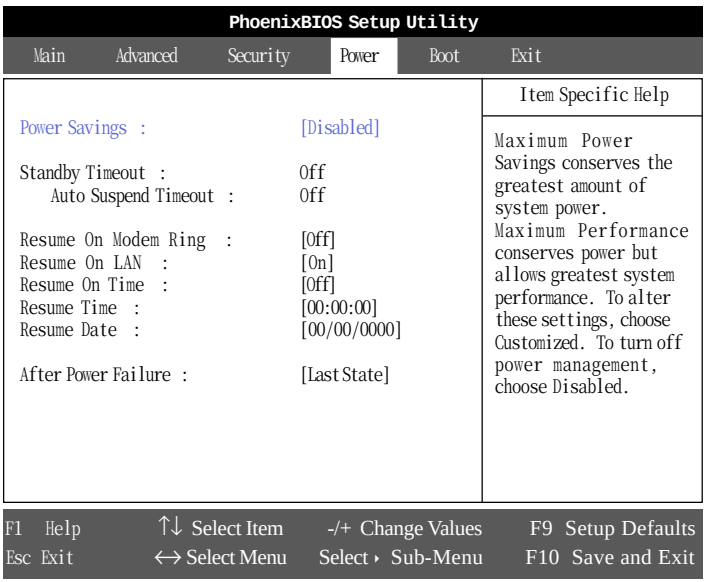
Password on boot
Choosing Enabled requires a password on boot. It requires prior setting of the Supervisor password. If supervisor password is set and this option is disabled, BIOS assumes user is booting. Options: [Enabled], [Disabled].

Fixed disk boot sector
Write protects the boot sector on the hard disk for virus protection. It requires a password to format the hard disk. Options: [Normal], [Write Protect].

Diskette access
Setting privilege of password to boot from or access the floppy disk. Options: [Supervisor], [User].

The Power Menu

Use this menu to specify your settings for Power Management. Remember that the options available depend upon the hardware installed in your system.



Power Savings

This item allows you to select Power Managment Mode. Select Customize to make your own selections from the following fields. Disabled turns off all power management. Maximum Power Savings conserves the greatest amount of system power. Maximum Performance conserves power but allows greatest system performance. Options: [Disabled], [Customized], [Maximum Power Savings], [Maximum Performance].

Standby Timeout

This feature allows you to specify the inactivity period required to put system in Standby (partial power shutdown). Options: [Off], [1 min], [2 min], [4 min], [6 min], [8 min], [12 min], [16 min].

Auto Suspend Timeout

This feature allows you to specify the inactivity period required after Standby to Suspend (maximum power shutdown). Options: [Disabled], [5 min], [10 min], [15 min], [20 min], [30 min], [40 min], [60 min].

Resume On Modem Ring

Select On to wake up system when an incoming call is detected on the modem. Options: [On], [Off].

Resume On LAN

Select On to wake up system by LAN devices. Options: [On], [Off].

Resume On Time

Select On to wake up system at predetermined time. Options: [On], [Off].

Resume Time

The time format is <HH> <MM> <SS>.

Resume Date

The date format is <MM> <DD> <YYYY>.

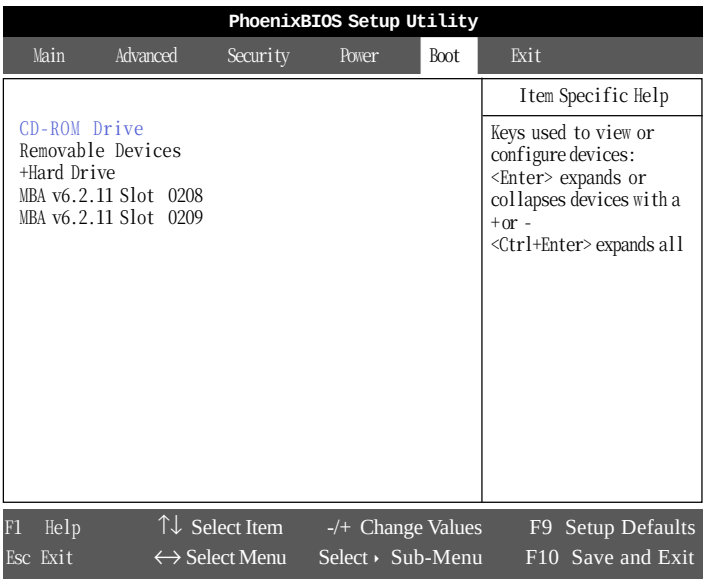
After Power Failure

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Stay Off]	Returns the system to an off state.
[Power On]	Returns the system to a full on state.
[Last State]	Restores the system to the previous status before power failure or interrupt occurred.

The Boot Menu

Use this menu to arrange to specify the priority of the devices from which the BIOS will attempt to boot the Operating System.



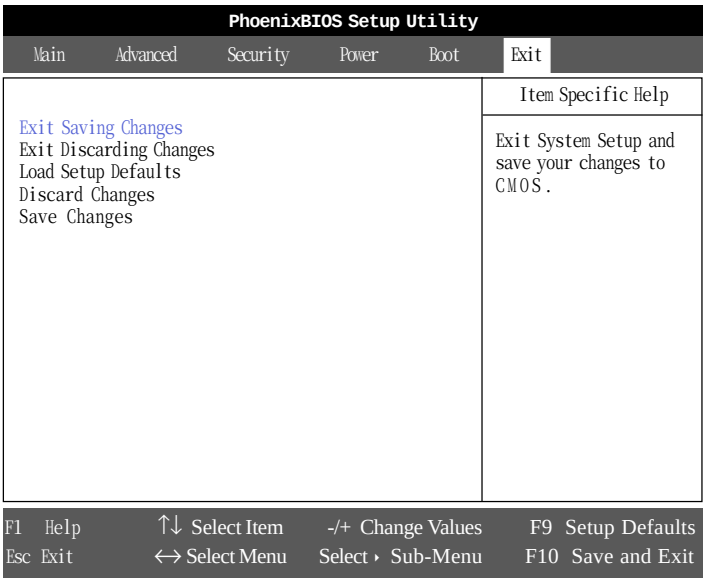
CD-ROM Drive, Removable Devices, Hard Drive

These are the generic types of devices on your system from which you can boot an operating system. You may have more than one device of each type. If so, the generic type is marked with a plus or minus sign. Use the <Enter> key to expand or collapse the devices marked with <+> or <->. Press <Ctrl+Enter> to expand all such devices.

To change a device's priority, first select it with the up-or-down arrows, and move it up or down using the <+> and <-> keys.

The Exit Menu

The following sections describe each of the options on this menu. Note that <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.



Exit Saving Changes

When you want to quit the Setup menu, you can select this option to save the changes and quit.

Exit Discarding Changes

When you want to quit the Setup menu, you can select this option to abandon the changes.

Load Setup Defaults

The option allows users to restore all of the BIOS settings to the Optimal Defaults. The Setup Defaults are the default values set by the mainboard manufacturer specifically for the optimized performance of the mainboard.

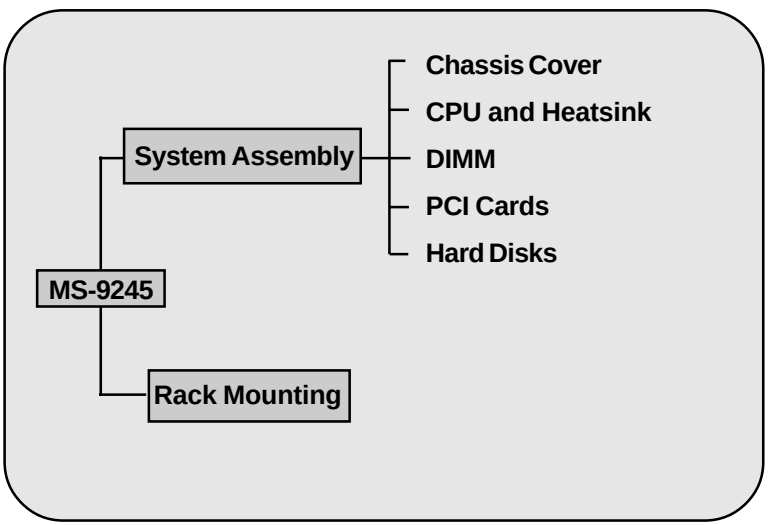
Discard Changes
The option allows users to restore all of the BIOS settings to previous values.

Save Changes
The option allows users to save the changes without exiting Setup.

4

Chassis Installation

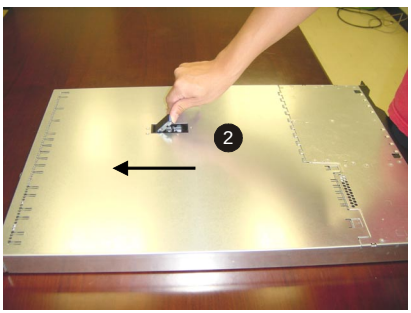
This chapter provides instructions on the hardware installation of the MS-9245 in two sections. ***System Assembly*** illustrates how to assemble each component of the MS-9245. ***Rack Mounting*** describes the procedures for mounting the unit into the rack in details. You can use the system assembly flowchart and the chart below to determine the proper sequence for removing or installing components to the server.



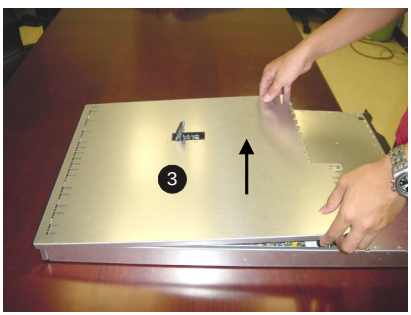
System Assembly

Chassis Cover

Locate the release button on the chassis cover.



Lift the release button to the upright position. Push the chassis cover forward.

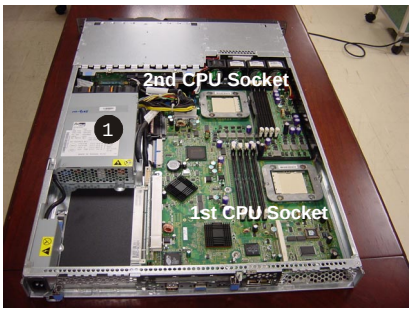


Lift the chassis cover to remove it from the system.

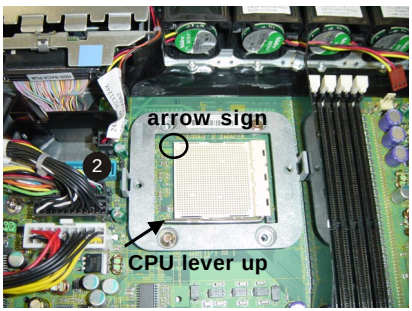
NOTE

Before you remove or install these modules, make sure the server is not turned on or connected to the AC power.

CPU and Heatsink

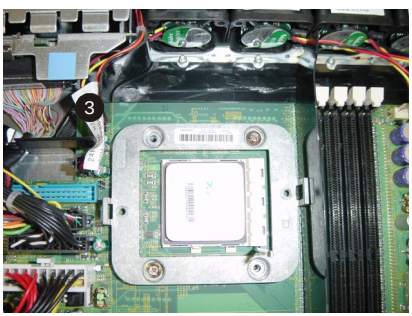


Locate the First and Second CPU sockets.



(If you plan on installing single CPU, use the first CPU socket.)

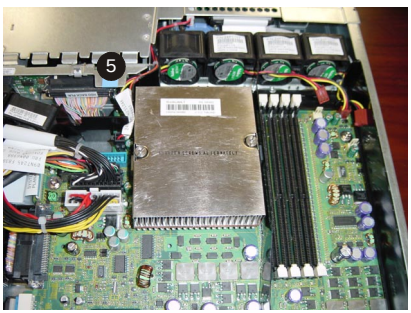
Lift the CPU lever up to a 90 degree angle.



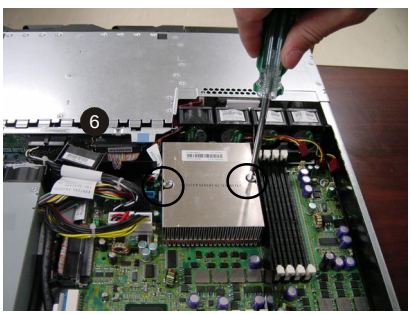
Place the CPU on top of the socket with the cut edge pointing to the arrow sign.

CPU and Heatsink (continued)

Push the lever down to secure the CPU in place.

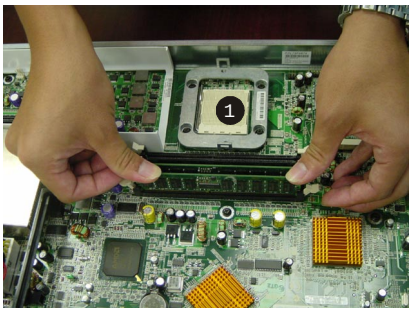


Place the heatsink on top of CPU.



Screw the heatsink to the chassis.

DIMM

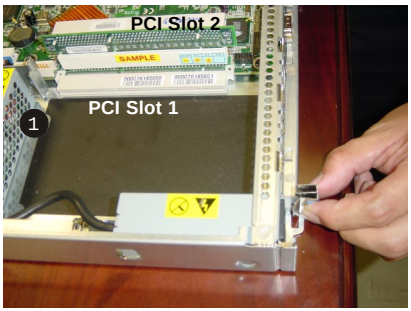


Locate the DIMM slots.

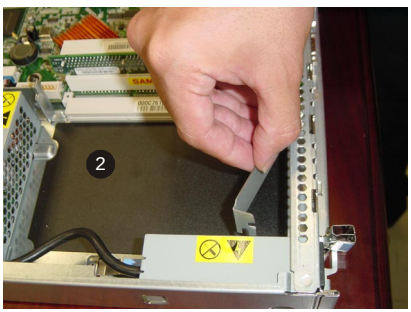
Install at least two DDR modules on the slots. The plastic clip at each side of the DIMM slot will automati-cally close.

NOTE
*Memory modules "in pairs" must be of **the same type and size**. Please refer to **DIMM Module Combination** on page2-4 for more information.*

PCI Cards

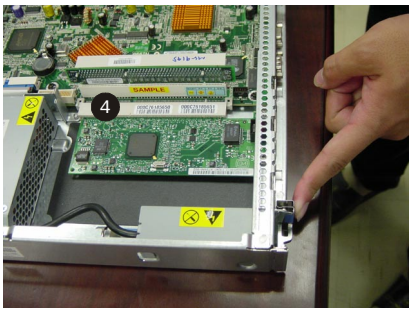


Remove the clip from the chassis.

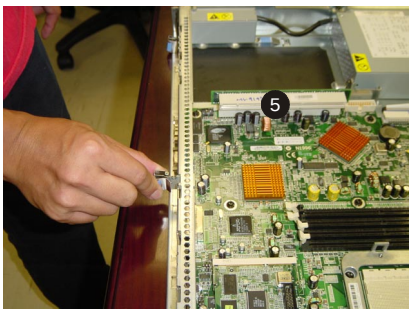


Take out the I/O shield on the first PCI slot.

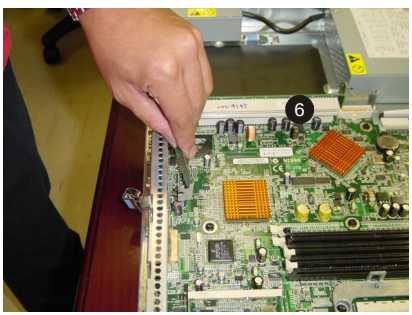
Insert the add-on card to the PCI slot.

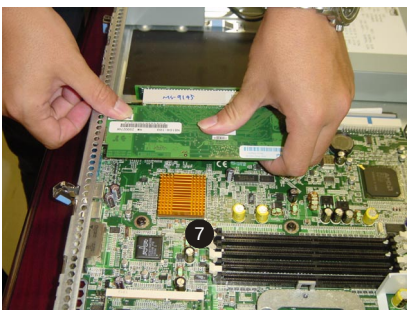


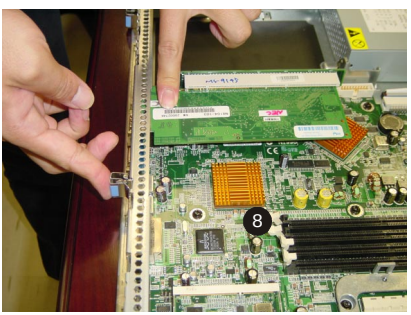
Replace the clip.



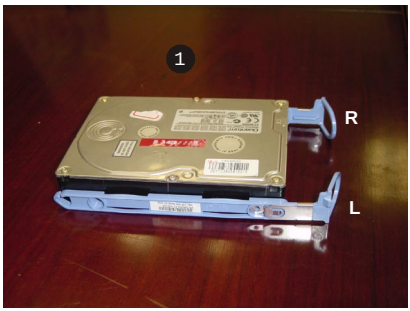
Follow the procedures described earlier to install the second PCI Card.



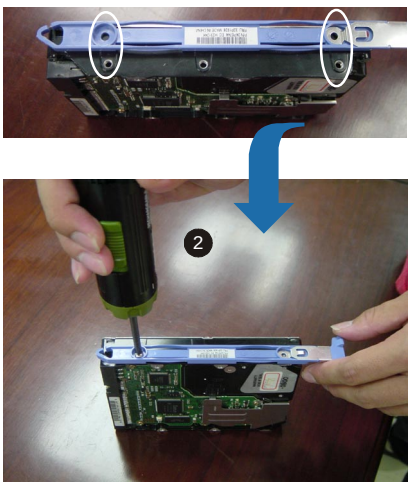




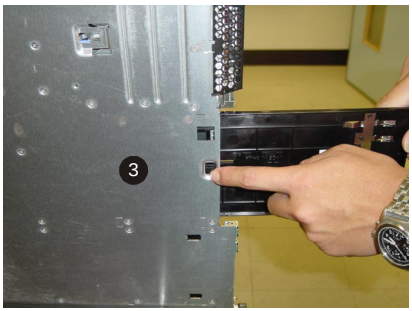
IDE Hard Disks



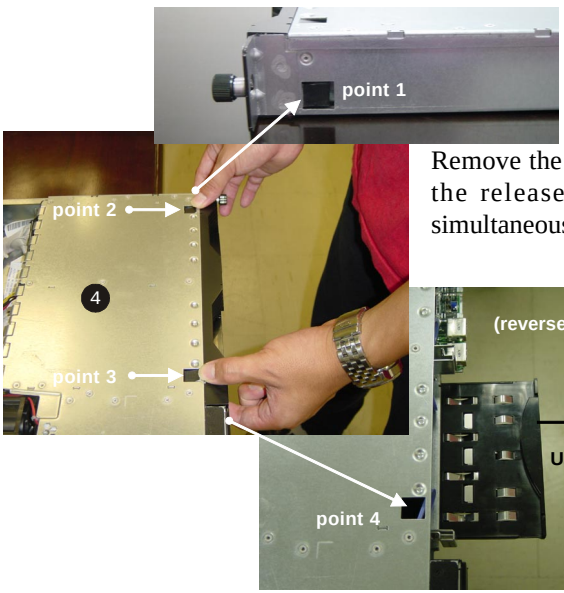
Take out the hard disk and HDD trays.



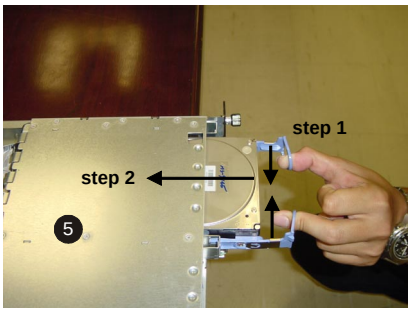
Screw the HDD trays to the hard disk.



Press the release button to pull out the USB tray **completely** from the chassis.

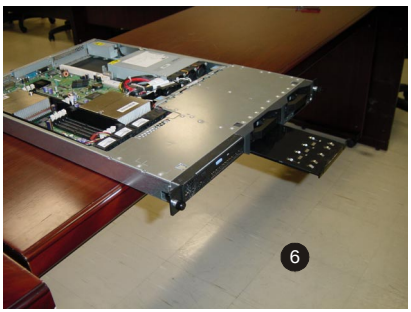


Remove the front bezel by pressing the release buttons (point 1~4) simultaneously.



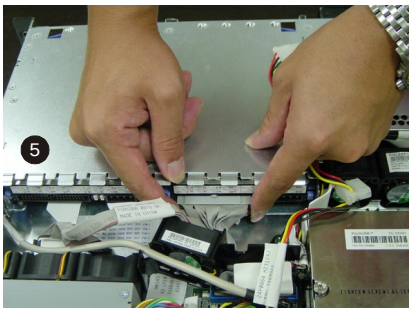
Pull the rings inward to push the hard disk back into the hard disk drive bay.

Follow the same procedures mentioned earlier to install the second hard disk.

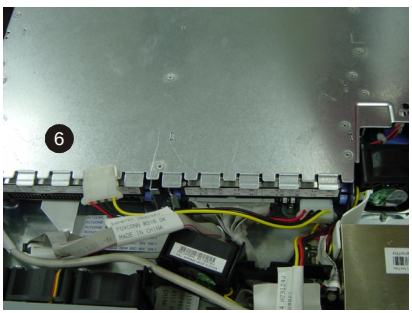


Replace the front bezel for IDE HDD.

Replace the USB tray and pull it open to rest any USB device on it.



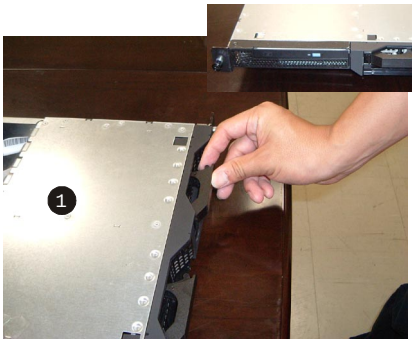
Connect the ATA100 cable to the first hard disk.



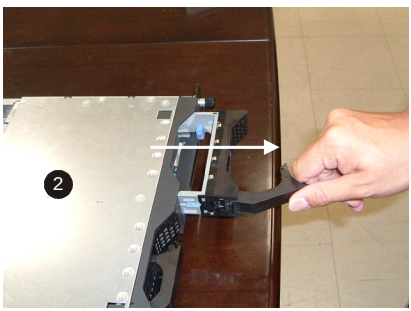
Connect the power cord to the first hard disk.

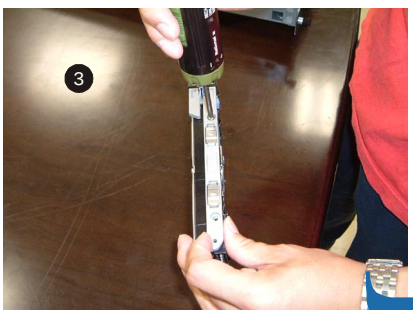
Connect the ATA100 cable and power cord to the second hard disk.

Hot Swap SCSI Hard Disks

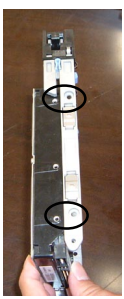


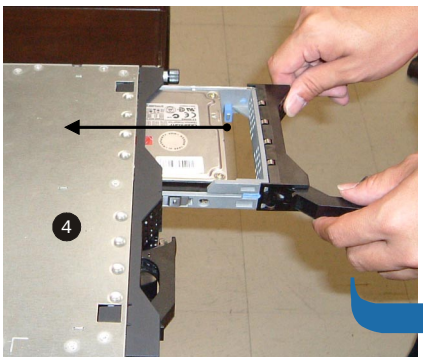
Unlock the HDD device holder and pull it out from the chassis.



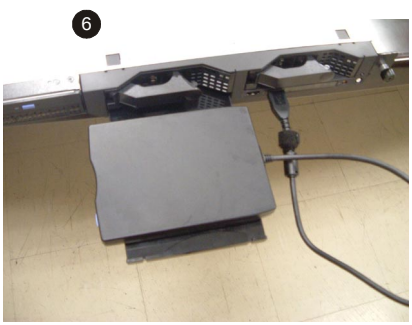


Screw the hard disk to the HDD device holder.





Slide the HDD device holder into the chassis and push it backward until you hear a “click” sound to secure the holder.

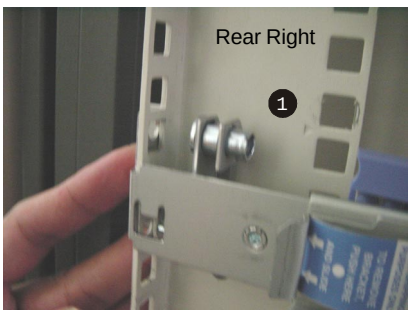


You may pull the USB tray open to rest any USB device on it.

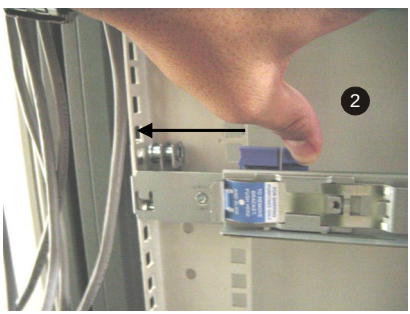
Rack Mounting

rail set

Take out the rail set for rack mounting.

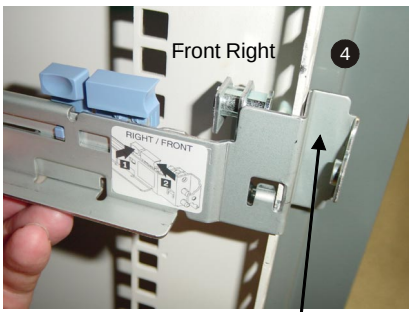


Position the rail to the rack cabin.

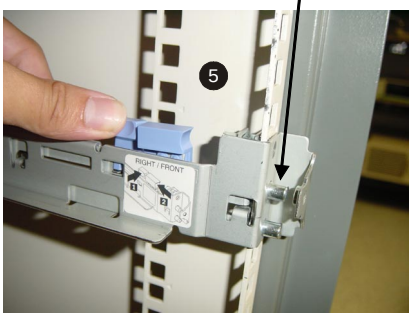


Press the button to push the locking tab forward. The rail will secure itself to the cabin.

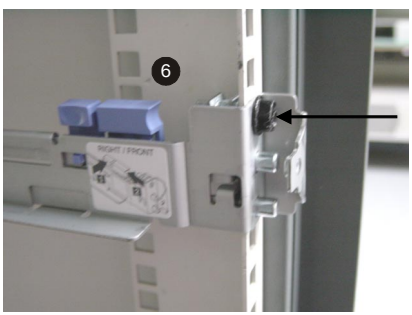
Screw to secure the rail on the rear.



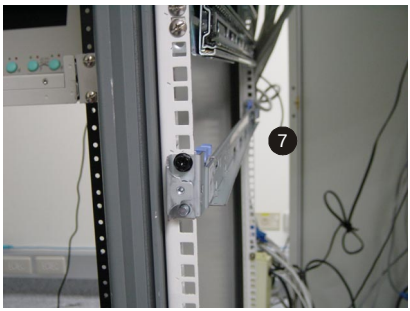
Position the rail to the rack cabin.



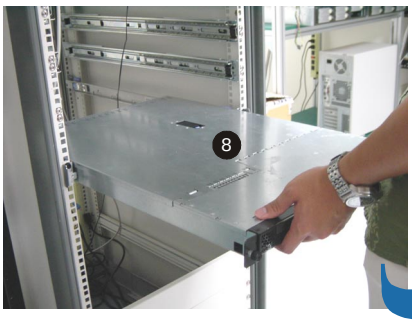
Press the button to push the locking tab forward. The rail will secure itself to the cabin.



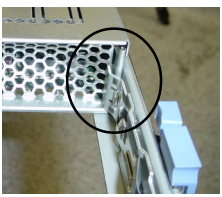
Screw to secure the rail on the front.

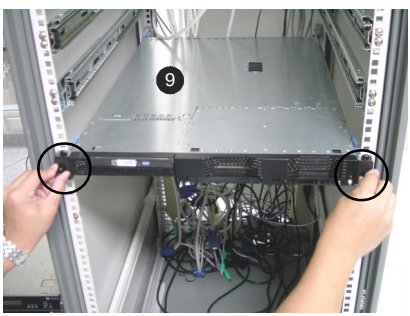


Follow the same procedures as mentioned earlier in this section to screw the left rail on the front and rear.



Align the 1U rackmount server to the rails and push it backward until it reaches the end.





Screw the system to the cabin.